

Potentiometric Surface Map of the Bedrock Aquifers of Carroll County, Indiana

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Carroll County, Indiana is located in the north-central section of the state and lies within the Upper Wabash River Basin.

The Potentiometric Surface Map (PSM) of the bedrock aquifers of Carroll County is mapped by contouring the elevations of 910 static water-levels reported on well records received primarily over a 50 year period. These wells are completed in aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells are completed under unconfined (not bounded by impermeable layers) settings.

The potentiometric surface is a measure of the pressure on water in a water bearing formation. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the aquifer, in contrast to groundwater in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement and pumpage. Therefore, measured static water-levels in an area may differ due to local or seasonal variations. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

Universal Transverse Mercator (UTM) coordinates for the water wells are either physically obtained in the field, determined through address geocoding, or reported on water well records.

The location of the majority of the water well records used to make the PSM are field verified. Elevation data are obtained from a digital elevation model. Quality control/quality assurance procedures are utilized to refine or remove data where errors are readily apparent.

Potentiometric surface elevations range from a high of 800 feet mean sea level (msl) in the southeastern corner of the county, to a low of 520 feet msl along the Wabash River in the west-central portion. The potentiometric contour lines crossing through Lake Freeman represents the potentiometric surface of the groundwater in the immediate area, not the water level of the reservoir, which is a man-made feature. Additionally, long-term high-capacity pumpage in the bedrock aquifer is causing local drawdown in the Delphi area. Flowing wells have been reported within the bedrock aquifers within Carroll County along Wildcat Creek, Deer Creek, Bachelor Run and the Tippecanoe River. Groundwater flow direction in the west-central and north-central portions of the county is generally towards the Wabash River and trends toward the southwest. In the northwestern part of the county, groundwater flow direction is generally to the west-southwest toward the Tippecanoe River, and in the eastern and southern portions of the county the flow is generally westward, or towards Wildcat Creek, Deer Creek and Rock Creek. Bedrock potentiometric surface elevation contours have not been extended through the western and southern portions of the county. These areas are lacking in data and/or covered by more prolific unconsolidated deposits that limit the necessity to complete wells in bedrock.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.